THE FUTURE OF POSSIBLE

DJI Response to FAA Knowledge Test for Recreational Flyers
Request for Information #34272-0004

September 19, 2019

DJI Technology, Inc. ("DJI") respectfully submits this response to FAA Request for Information #34272-0004.

Questions and Responses

5.1. Describe your organization and explain why you believe you are qualified to participate in this opportunity

DJI has long been supportive of efforts to educate and inform UAS operators of the principles of safe operation. In 2017, we launched our own "Knowledge Quiz," which prompts new operators to answer multiple choice questions about the rules of safe operation before they take their first flights. This Knowledge Quiz was developed in collaboration with the Federal Aviation Administration (FAA), who reviewed our questions and answers to provide informal guidance on their accuracy and completeness. We subsequently launched our Knowledge Quiz in the United Kingdom, Germany, Hong Kong, and Australia. We are, as far as we know, the only organization in the world that already has implemented into its products a knowledge testing mechanism for its UAS users to provide an assurance of education about safety principles and rules.

The DJI Knowledge Quiz is built right into DJI GO, our UAS ground control station software that works on iOS and Android mobile devices. Therefore, we are able to bring the test administration process directly to the UAS operator immediately prior to the first operation, enhancing its convenience and increasing the probability that the user will actually complete the knowledge testing prior to flying his or her drone.

Now that FAA is set to develop and deploy its own official knowledge testing, as was mandated by Congress, DJI, with its majority market share of this category of UAS, is in a position to be a key facilitator of that program's success. We would hope to be able to provide this testing, as a designee, within our DJI GO flight apps, ensuring that the experience is user-friendly, free of unnecessary costs, and a key driver of a very high rate of compliance so as to enhance the safety of recreational UAS operations in the United States. For this initiative be successful, it is crucial that the test must be easily accessible and not overly burdensome to complete. Ideally, the test should be free of charge as well as limited in duration, to encourage compliance. In the context of UAS Registration, the 2015 FAA ARC noted that to encourage maximum compliance, registration should be free. Knowledge testing should be free for all the same reasons as noted in the ARC's Report.

Below we respond to FAA's specific questions in its RFI, in light of the opportunities that our capabilities present. To that end, DJI appreciates FAA efforts to continue important discussions among participants who will develop the technical and legal frameworks for knowledge testing. We look forward to participating in this endeavor and would appreciate the opportunity to further engage with regulators and industry partners to pursue the establishment of a practical approach to knowledge testing.

5.2. What do you consider would be the most effective model for administering the training and testing content, and how would it benefit both the designee and the FAA?

The most effective model is to leverage the existing technological capabilities of OEMs and other companies in the UAS industry. Many UAS products, as well as services, already have the ability to establish and manage user accounts, store credentials, and track user status in a way that can be adapted to a testing requirement. This model benefits the designee by providing the most convenient way to complete the testing, using existing technologies, making the experience enjoyable, and avoiding unnecessary costs and burdens, while benefitting the FAA by encouraging the broadest rate of compliance.

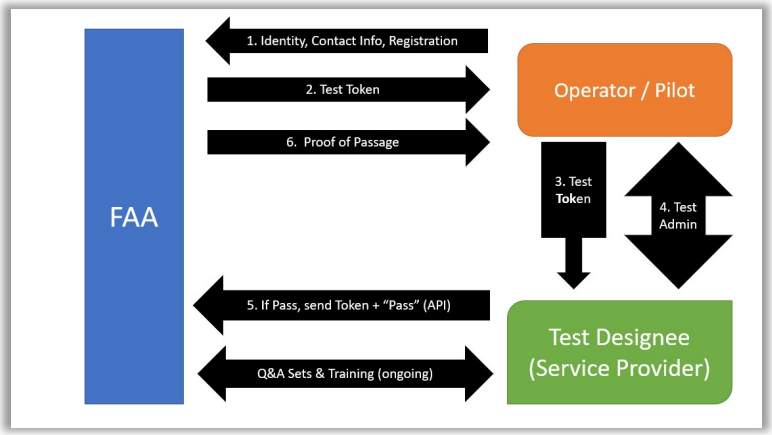
5.3. How should the training and testing content be delivered by the FAA to designee(s) administering the test?

FAA should provide the question bank and answers to designees. Given that these questions and answers should be relatively straightforward in order to serve the intent of Congress, that completion will largely depend on voluntary compliance, and that passing the test is of benefit only to non-compensatory recreational operations, there is little reason to mandate complex security arrangements for the delivery of Q&A sets. Therefore, the FAA can share content with designees in a low-cost, direct way, such as by API, with confidentiality obligations enforceable under the MOA. The delivery method should recognize that the ultimate goal is not to make prospective drone operators pass or fail a test, but to ensure they understand important principles of drone operation as directed by Congress.

Training content should be given through API (by FAA) in JSON format. The designee would be in charge of getting content from FAA (calling API) and displaying the latest training content to the testers. We envision that the platform will be a web app that is compatible with both desktop and mobile, much like the massive online course vendors like Coursera or Udacity provide. Training content can be accessed without logging in to facilitate learning, and will be accessed via drone software in widespread use today, such as DJI GO.

5.4. How would you divide roles and responsibilities between the designee(s) and the FAA?

The FAA should be in charge of operators' personal identifiable and contact information, tracking the fact that the operator passed the test, providing proof of passage, and the content of questions and answers as well as training materials. The designee should be able to administer the test from a technical point of view by using a Test Token, i.e. a type of PIN, digital certificate, or other unique identifier. The Test Token process may use the OAuth 2.0 standard, for example. By using tokens, no designee is required to collect or receive personally identifiable information or to comply with government-level privacy protection requirements which would be costly and burdensome to the designee, as well as create a potential data breach liability. The FAA should generate the certificate/proof of passage once the testing is completed, similar to the current UAS registration certificate. Here is a schematic diagram of how this system would generally work, in six linear steps:



5.5. What recommendations would you make concerning governance and collaboration?

Transparency in requirements and process for becoming a designee. LAANC has been, at times, unclear in this respect, with shifting expectations. This program will impact many more operators than LAANC.

5.6. What are the basic criteria for a designee applicant?

The technical ability to program an app, web page or other interface to administer the test and to deliver to FAA confirmation of passage of the test. LAANC is a good model for establishing a set of technical criteria and testing to be accepted as a designee.

5.7. What, if any, testing data should be stored, how long should it be stored, and how should it be made available to the FAA and law enforcement?

Testing data (relating to test passage) should be stored by FAA along with the operator's registration records. FAA should make it available to other agencies pursuant to appropriate legal process, due process, and in accordance with the 2018 FAA Reauthorization Act. Designees should not be expected or required to interact with law enforcement or other agencies in connection with determining whether someone has taken or passed the test. Rather, these agencies should be able to query the FAA, who will have all information about the operator's identity and records of taking and passing the test, as well as UAS registration. Records should be stored, by FAA, for the number of years expected to be relevant to investigations, in light of statues of limitation and other principles.

5.8. Demonstrate that you be able to maintain FAA records in accordance with the Federal Records Act, the Privacy Act, and the E-Government Act if determined applicable, and provide the required notifications in connection to these laws, as appropriate. How can you ensure the integrity of the data and address privacy concerns?

We have a sophisticated global Legal department that ensures we comply with privacy requirements around the world, including GDPR. We believe that some of these complexities can be avoided by using a short-expiration Test Token (or PIN) issued to each operator by FAA for purposes of taking the test, with no PII required to be shared with the designee. DJI has been a fierce advocate for the privacy interests of UAS operators, especially with respect to the Remote ID initiatives that have been in discussion since 2017. We would not undertake to become a designee if we were not confident that we would meet the applicable privacy requirements.

5.9. How would you handle test takers that are minor children under the age of 13?

Minors, and certainly those under 13, should be exempt from the knowledge test, particularly when flying UAS under the supervision of an adult. (This flexibility to exclude minors is within FAA's authority, as Congress indicated that FAA may "update the operational parameters" for Section 349.) It would make little sense to require minors to pass a test when they are not permitted to register a UAS. In any event, using the Test Token system we propose, the name, location, and contact information of the minor is never provided to the designee, avoiding some of the apparent concerns arising from COPPA and perhaps other relevant laws. We also envision that if the test taker is under 13, the test is still offered essentially as a voluntary process, without any of the tracking or identification steps, thus educating minors without actually administering a test process.

5.10. What data should the test taker be required to submit to the test administrator in order to take the test?

Only a testing token number (e.g. a six-digit randomized alphanumerical code such as H6Y2S9) generated by the FAA's UAS registration/testing portal and valid for, say, 12 hours. Successful passage of the test will cause the administrator to generate a "test pass" confirmation that is transmitted to FAA and that is verified via an algorithm that is part of the testing back-end system. No PII, identity, location, contact or other information will be required to be provided to the test administrator or transmitted to or from the FAA and designee. This system could be automated as an API or provided manually if the Test Token is human-readable. In any event, information about the test taker sent to the administrator is kept to a minimum.

5.11. Describe how you would verify the identity of the test taker

We would propose not to involve the designees in verifying the identity of the test taker. This should be done on the FAA's end during the UAS registration and Test Token generation process (where, for registration, it needs to happen anyway, and where the upcoming Remote ID rules will require it as well). We do not think it is a good idea for designees (private parties) to be requesting and collecting identity information about UAS operators, and we are not certain that FAA has the authority to require persons seeking compliance with a statute to surrender identity information to a private service provider, with no other means of compliance offered by the US government (such as an alternative test offered directly by FAA).

If some form of verification is required by FAA at the time of testing, such a process should be limited to a mobile phone number collection allowing a two-factor authentication text code (SMS) to be sent to the

number. However, in the context of a largely voluntary-compliance knowledge testing requirement that confers no economic-generating benefit, this type of identity system is largely unnecessary.

In the event complex verification requirements are imposed, DJI would be compliant if we choose to become a designee. However, this requirement would make it less desirable to become a designee by imposing data protection risk upon designees. Identity information obviously needs to be maintained at FAA as well. Creating multiple repositories of identity data seems unnecessary, costly to designees, and increases data breach risk. DJI and others may choose not to pursue being a designee if these risks or burdens are deemed to be too high. Such a decision would negatively impact compliance rates and the success of the program, so we strongly encourage FAA to find a way to avoid collection of any PII by designees.

5.12. How would you recommend issuing proof of test passage to the test taker? What information would be included on the record? Who should set the standard?

The "proof" of test passage should be generated by, and stored at, FAA. This is especially important in the event that UAS providers fail financially, and go out of business. It is a poor idea to store regulatorily-mandated credentials or certificates (which are essentially core government functions) only at a private company. The future business success or failure of the designee should have no impact on the test taker because proof of test passage should be available from, and stored at, FAA. FAA should set the standard for what this proof looks like. We note that the American Red Cross has an example of issuing lifeguarding certificates with QR codes. The QR codes can be used to verify the certificates or expiration dates, are difficult to casually tamper with, but the test taker can print them or display them easily. Certificates should be available electronically to facilitate portability.

5.13. How can FAA or a law enforcement entity (LE) verify the proof of passage record? Should the FAA and LE request data from the designee?

FAA and LE can verify proof of passage in a similar way to how UAS registration is verified today: The LE makes a request to the FAA pursuant to statutory, regulatory and due process requirements. FAA looks up the record on its system and provides the information to LE. LE should not request the data from a designee. Requests to designees raise complexities concerning privacy, disclosure, and potentially legal fees and expenses for the designee. If there is a desire to make the lookup system more automated or online, access controls will be crucial, but also complicated, and the effort relating to such a system should likely be combined with the FAA's back-end work on the coming Remote ID system, which will also need to match identities with specific UAS and operations. We note that the American Red Cross allows employers to verify the training status of lifeguards with a QR code. This approach makes it simple for test takers, FAA and LE to provide and verify the proof of passage.

5.14. Demonstrate your experience developing interactive user interfaces and capabilities, including experience with developing mobile applications and/or standardized tests. Include a discussion of platforms, tools, methodologies.

DJI is the market leader in civilian small UAS, all of which are operated using mobile applications on a smart phone or tablet, which acts as the UAS ground control station (GCS). These mobile applications, available for iOS and Android operating systems, include DJI GO, DJI GO4, DJI Pilot, and DJI Flight Hub. Since late 2017, we have included our own "Knowledge Quiz" testing in DJI GO4 software for multiple countries including the United States, which requires our users to successfully pass a multiple choice test with a 100% required correct-answer score, and stores the fact of the user passing in the user's DJI account so that they only need pass the test once.

We also use testing platforms to train our consumer and enterprise dealers, in a browser-based system called DJI Feed. The courses on this system are in the SCORM 1.2 or 1.3 format. These platforms provide interactive lessons on DJI products and solutions, with a test at the end. Some of the tools we use to facilitate these functions are Cornerstone and Articulate. This is how we assure ourselves that our many dealers are knowledgeable about our products and able to answer customer questions and represent DJI's brand to the world.

5.15. Identify other potential collaborators, such as other government agencies and support contractors, who the respondent believes should be part of the collaboration phase.

We think this process compels a straightforward method of implementing low-cost knowledge testing in what will essentially be a voluntary compliance regime. Although input should be sought from interested stakeholders, we do not see a need to involve additional government agencies or contractors, who may complicate and slow down the implementation of this important educational initiative. We do believe that the broad recreational UAS user community should be part of the collaboration, especially newcomer Community Based Organizations that have the ability to reach large numbers of recreational operators.

5.16. Describe the spectrum of potential approaches to administering the knowledge test and training. How long would your recommended approach take to implement?

We expect many of the submissions in response to this RFI to focus on a LAANC-like system, in which the UAS industry funds and leads the development of a variety of front-end solutions for UAS operators, and that those solutions will interface via APIs with the FAA's back end data systems, and likely also with each other. We agree with this approach from a technical point of view, particularly because of the industry's ability to develop solutions more quickly than government. We also are familiar with, and support, the LAANC screening and on-boarding process, in which technical capability and compliance with the LAANC rules are the FAA's criteria for any organization's approval as a supplier of LAANC services.

While a LAANC-like system makes sense for some aspects of the knowledge testing process, new issues arise when the result is to mandate that personal identity information be collected and held by private companies performing what is essentially a government function. The approach we recommend is for FAA to establish the questions and answers, training materials, as well as a mechanism to generate a Test Token so that the test can be taken in multiple different ways and via various designees (service providers) without providing PII or other sensitive information to those designees.

We believe this approach would take about six months to implement if all parties move forward expeditiously.

5.17. Describe your experience with SCORM compliant Learning Management Systems (LMS). Include discussion on your ability to host a SCORM compliant LMS

We have full ability to host a SCORM compliant LMS, and already do so. As explained in 5.14, we use testing platforms to train our consumer and enterprise dealers, in a browser-based system called DJI Feed. The courses on this system are compliant with either SCORM 1.2 or 1.3. These platforms provide interactive lessons on DJI products and solutions, with a test at the end. This is how we assure ourselves that our many dealers are knowledgeable about our products and able to answer customer questions and represent DJI's brand to the world.

5.18. What additional technical standards, conventions, or other capabilities are needed to facilitate the design and administration of the training and testing content by designees?

FAA must determine what a "passing" score is. This score should be reasonably achievable, so as not to discourage voluntary compliance, and in consideration of the recreational nature of these operations. Nearly everyone who makes a good faith effort should be able to pass, by reading or viewing some basic materials on the requirements of safe operation. It is also crucial that the test not take too long, so as not to discourage people from completing it.

Thank you for your consideration.